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ORIGINAL ARTICLE

Overuse of bronchodilators and steroids in bronchiolitis of different severity
Bronchiolitis-study of variability, appropriateness, and adequacy

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Abstract
Background: In the management of acute bronchiolitis there is a generalised use of treatments that have not been shown to be useful or efficacious in clinical studies. The objective of this study was to determine the appropriateness in the treatment of acute bronchiolitis of different severity within different clinical care settings.
Methods: This is a cross-sectional, descriptive study of 5647 cases of acute bronchiolitis in 91 Spanish hospitals and primary care centres. We classified the appropriateness of the treatments according to the recommendations of a consensus conference.
Results: There was an inappropriate use of treatments in 58.3% of the cases during the acute phase and in 45.4% during the maintenance phase. There was a generalised use of inhaled beta 2 agonists, regardless of the severity of the patients (hospitalised patients 69.3%, emergency care 63.2% and ambulatory 64.1%). Adrenaline was used in 30.1% of hospitalised cases and in 80.2% of intensive care patients. Systemic corticosteroids were not only used in one-third of hospitalised patients but also in 25.8% of ambulatory cases.
Conclusions: In acute bronchiolitis in Spain there is a wide use of treatments that are not recommended by the available clinical practice guidelines. Beta 2 agonist bronchodilators and corticosteroids are widely used and maintained, regardless of the severity of the patients.

Introduction

Acute bronchiolitis is the main cause of hospital admissions related to acute lower respiratory airway infections in infants. It has significant repercussions at all health care

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levels. Literature on the management of bronchiolitis is very abundant in diagnostic as well as preventive-therapeutic aspects. The published information has been revised in depth, and different clinical practice guidelines (CPGs) are available.[1–5] The evidence suggests that in the treatment of bronchiolitis, the use of symptomatic support measures is fundamental for the management of fever, respiratory secretions, hyporexia, respiratory distress and hypoxaemia. Other treatments, in spite of their wide use, have not shown enough efficacy in clinical trials and present unfavourable benefit-risk ratios. A therapy trial with inhaled beta 2 agonists or adrenaline (better with hypertonic saline solution) has been proposed by some CPGs, but only for moderate-to-severe cases. These treatments can only be maintained if there is a documented improvement that compensates their costs and adverse effects.

The objective of our study was to analyse the appropriateness in the treatment of bronchiolitis in a large and representative sample of different health care settings in Spain. This study complements a preliminary one, conducted within the aBREVIADo Project, which describes the global variability in the clinical management. Here, we present an analysis of the appropriateness of the treatments in relation to the severity of the patients.[6]

Materials and methods

Design

This was a cross-sectional, descriptive study of acute bronchiolitis cases in a sample of hospitals, emergency services and primary care centres or offices in Spain. The participating centres belonged to 12 autonomous communities (25 provinces) and corresponded to 31 hospital centres (18 complete hospitals, 7 hospitalisation services, and 6 emergency services) and 60 primary care centres or offices (Annex 1). The information of this descriptive study is part of the aBREVIADo Project (Bronchiolitis-Study of Variability, Adequacy, and Adherence), in which the recommendations made by the consensus conference of bronchiolitis were used as reference standards.[7]

Study period

From October 2007 to March 2008.

Inclusion criteria

All bronchiolitis cases were diagnosed during the study period according to the McConnochie criteria[8]: first acute episode of respiratory distress with wheezing preceded by a cold-like clinical picture of the upper respiratory airway (rhinitis, cough, with/without fever), which affects children younger than two years of age.

Exclusion criteria

Patients with previous wheezing episodes.

Data gathering

Data gathering included collecting the consecutive records of cases diagnosed by collaborating doctors in the study as well as the periodical review of databases and lists or copies of reports for the records of cases diagnosed by other doctors.

We designed a questionnaire for the collection of the study's variables that included general data, signs-symptoms, risk factors, diagnostic tests, and treatments. A complete description of these items is available in a previous article.[7] We designed a score of the severity of disease by gathering the variables that have been shown in previous studies to have an adequate interobserver concordance, including the following: respiratory rate (<45; 45–60; >60 per minute), pulmonary ventilation (normal; hypoventilation; silent chest), wheezing (mild expiratory; all expiration; expiratory and inspiratory), retractions (not or mild intercostal; moderate intercostal-suprasternal; severe or nasal flaring), and consciousness (normal; agitated; lethargic); these variables were measured after adequate aspiration of secretions (0–2 for each component; maximum score of 10). The treatments were differentiated according to their use in the acute or maintenance phases of the disease. We considered acute phase treatments in inpatients: those received during admission; in ambulatory patients: treatments administered at the place of diagnosis and those recommended during the following 24 h.

The treatment was classified according to its appropriateness following the recommendations of the consensus conference as: first choice, alternative or inappropriate.[4,7] Patients admitted to the intensive care unit (ICU) were excluded from this classification. The consensus conference was conducted and published after gathering the cases, so that it did not influence in the management of patients.

Ethical aspects

It was specifically recommended not to modify, in any way, the routine management of patients with bronchiolitis. Data were gathered anonymously without registering the patients' identifying data.

Statistical aspects

Statistical processing was performed with SPSS version 11.5.1 (serial number 9036057). We did not conduct an estimation of the sample size necessary for each setting because in almost all of the centres, all of the patients diagnosed with bronchiolitis were included. However, we had calculated that a subsample of 300 patients would allow the estimation of percentages with a precision of $\pm$5% as well as the ability to discriminate differences of at least 12% (for theoretical most unfavourable percentages of 50%, α value of 5%, and β of 20%).

We estimated confidence intervals (CI) for the main measurements. We compared the variables by health care setting (offices, emergency, hospitalisation, and intensive care) using the χ^2 test or exact tests for the qualitative variables and variance analysis for the quantitative variables.